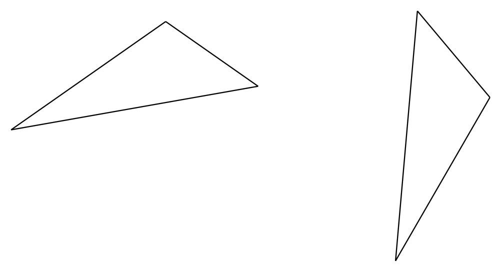
Math 191 Fundamentals of Mathematics II
14.3 Congruence, continued
March 28, 2014

Notation for congruent triangles: If $\triangle XYZ$ is congruent to $\triangle PQR$ in such a way that we can align the two triangles by matching vertex X with vertex P, vertex Y with vertex Q, and vertex Z with vertex R, we write:

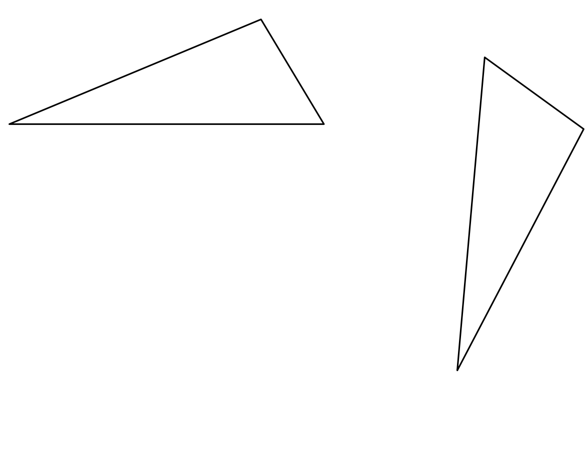


It would be wrong to write

We want there to be faster ways to check whether two triangles are congruent formally. In fact, we have ____________ methods.

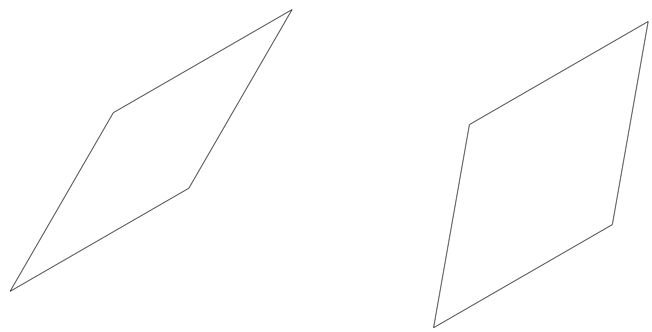
Method 1: ____________________________________ congruence condition (____________ criterion): Two triangles are congruent if all pairs of ____________________________________ are ____________________________________.

In other words, a triangle that has side lengths a, b, and c units is __________________ to any triangle that also has side lengths a, b, and c units.
For example:



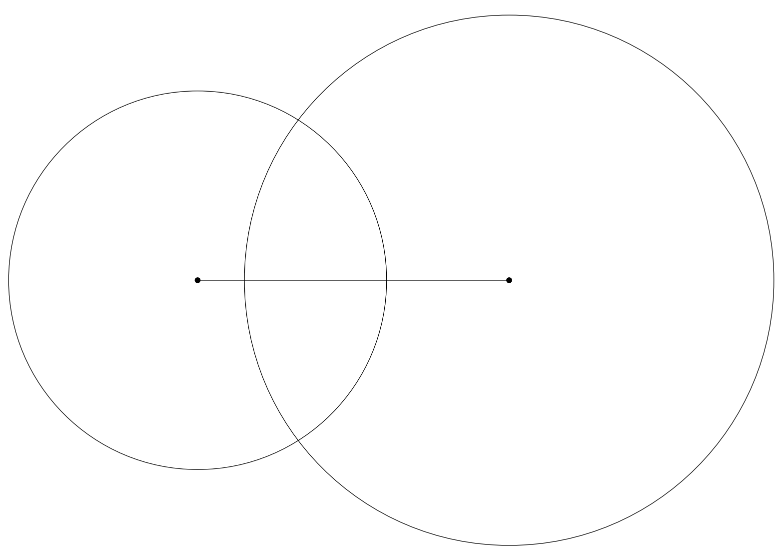
This means that once the three sides of a triangle are fixed, then the ____________________ of that triangle are also ____________________. This is called the *rigid property of a triangle*, and is the reason that, for example, triangular braces are used to make buildings more stable.

Note: a quadrilateral does not have this rigid property. For example:

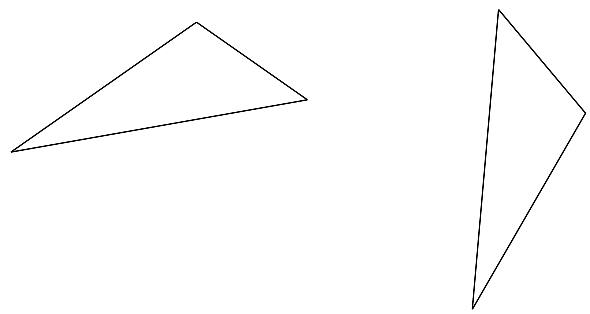


Let's see why the SSS criterion works:

If we were to construct a triangle with side lengths a, b, and c units, we use circles. There are _____________ possible triangles, but

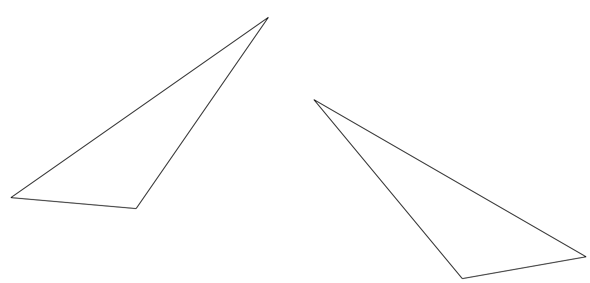


Method 2: ______________________________ congruence condition (_______________):
Two triangles are congruent if ____________________ of corresponding angles and their included sides are equal.



Why does this work?

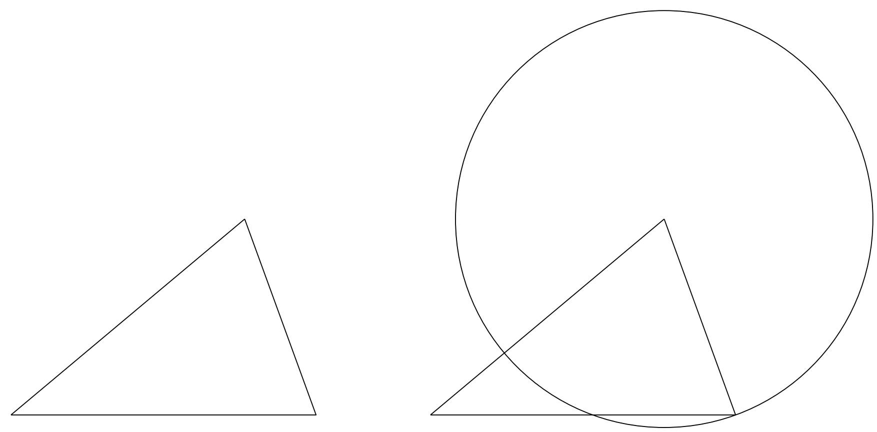
Method 3: ______________________________ congruence condition (_______________):
Two triangles are congruent if ______________________________ of corresponding sides and their included angles are equal.



Why does this work?

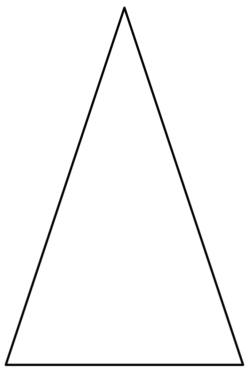
Is AAA a congruence condition for triangles?

Is ASS a congruence condition for triangles?



Some simple applications of congruent triangles:

1. Instead of using ____________________________, we can use congruent triangles to show that an isosceles triangle has two equal angles.



Furthermore, we see that

so

2. We can use this result to show that a rhombus has perpendicular diagonals.